

**REMARKS**

The remainder of this Amendment is set forth under appropriate subheadings for the convenience of the Examiner.

**Interview Summary**

Applicants' Attorney, N. Scott Pierce, would like to thank the Examiner for conducting a telephonic interview on February 21, 2006. An Interview Summary PTOL-413 regarding the interview was received on the same date. The amended claims and arguments discussed during the interview are substantially the same as those presented herein. Also, as suggested by the Examiner during the interview, a Declaration of William C. Rice Under 37 C.F.R. § 1.132 ("the Declaration") is being concurrently filed with this Amendment.

**Amendments to the Abstract and Claims**

The abstract of the application is rewritten as a single paragraph.

Independent Claim 9 is amended to recite that the antiloading composition comprises a first organic compound and a second organic compound, each of which satisfies the recited conditions. Support for this amendment can be found in original Claim 16 and in the specification, for example, on page 5, lines 19-20 and lines 26-30. Independent Claim 9 is further amended to recite that each of the first and second organic compounds is represented by a formula referred to in Claim 12. Accordingly, Claim 12 is canceled.

Claims 10 and 11 are amended to make clear that the first organic compound has the recited water contact angle and satisfies at least one specified condition for  $T_{\text{melt}}$ , F or P.

New Claims 36-39 are added. Support for the recited lauryl sulfate can be found in the specification, for example, on page 9, lines 23-27 and Table 1 on page 15. Support for the recited amount of the lauryl sulfate can be found in the specification, for example, on page 1, lines 14-18, page 5, lines 3-5 and in Example 1 at pages 11-13. Support for the limitation that lauryl sulfate is the only organic antiloading compound included in the recited antiloading composition, can be found in the specification, for example, in Examples 1 and 4 and Tables 1 and 2. In particular, Example 4 on pages 17-18 describes performance of A 270 P500 sand papers, each of which is coated with each experimental antiloading compound, including a lauryl

sulfate. Table 1 on page 15 lists various experimental antiload compounds, including lauryl sulfates.

No new matter has been added.

#### Objection to the Abstract

The Examiner stated that the abstract of the application is not limited to a single paragraph.

As discussed above, the abstract of the application is rewritten as a single paragraph, obviating the objection. Withdrawal of this objection is respectfully requested.

#### Rejection of Claims 10, 11 and 16 under 35 U.S.C. § 112, second paragraph

Claims 10, 11 and 16 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Claims 10 and 11 are amended to recite that the first organic compound has the recited water contact angle and satisfies at least one stated condition. As amended, the scope of Claims 10 and 11 falls within the scope of independent Claim 9. Claim 16 is canceled. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

#### Rejections under 35 U.S.C. § 102(b)/103(a) in View of Peterson '554, Law '952 and Law '682

##### *A. Summary of Rejection*

Claims 9-13 and 16 are rejected under 35 U.S.C. § 102(b) or in the alternative, under 35 U.S.C. § 103(a) over US 4,988,554 (hereinafter "Peterson '554"). These claims are also rejected under 35 U.S.C. § 102(b) or in the alternative, under 35 U.S.C. § 103(a) over US 5,704,952 (hereinafter "Law '952"). Claims 9-16 are rejected under 35 U.S.C. § 102(b) or in the alternative, under 35 U.S.C. § 103(a) over US 6,261,682 B1 (hereinafter "Law '682"). Claims 14 and 15 are rejected under 35 U.S.C. § 103(a) over Peterson '554.

##### *B. Applicant's Invention and Advantages*

As currently amended, Applicants' claimed invention in independent Claim 9 is directed

to an abrasive product that comprises an antiloading composition including *first and second* organic compounds, *each of which independently has a water contact angle  $W_g^\circ$  less than that of zinc stearate ( $C_{17}H_{35}CO_2^-$ )*, and satisfies at least one condition selected from the group consisting of a melting point  $T_{melt}$  greater than about 40 °C, a dynamic coefficient of friction F less than about 0.4, and an antiloading criterion P greater than about 0.2. *Each of the first and second organic compounds independently is represented by a formula selected from  $R-OSO_3^-M^+$ ,  $RCONH(CH_2)_3N^+(CH_3)_2CH_2COO^-$ ,  $R-CONR'CH_2CO_2^-M^+$ , or  $R-O(CO)CH_2OSO_3^-M^+$* , where R is C6-C18 linear alkyl; R' is C1-C4 linear alkyl; and  $M^+$  is an alkali metal ion.

Applicants' claimed invention in independent, currently-amended Claim 9 has an advantage in that a particular water contact angle ( $W_p^\circ$ ) of the antiloading composition can be fine-tuned to be compatible with a subsequent coating, which can reduce defects due to contamination by the antiloading compounds (see, for example, page 3, lines 22-25 and page 6, lines 1-6). As described on page 3, lines 10-11 and page 5, lines 19-20 of the specification, the  $W_p^\circ$  of the antiloading composition can be, at least partly, tuned by selecting first and second organic compounds having certain water contact angles and by combining them in a desired portion. In addition, Applicants' claimed invention of Claim 9, as currently-amended, has an additional advantage in that unacceptable contamination of work surfaces by zinc stearate or an antiloading compound having a water contact angle which is the same as, or higher than, that of zinc stearate can be minimized or avoided, particularly for work surfaces to be coated after abrasion, e.g., with paint, varnish, powder coat, and the like.

*C. Applicants' Invention is Novel in View of Peterson '554, Law '952 and Law '682*

Peterson '554 discloses an abrasive article coated with the lithium salt of a fatty acid, such as lithium stearate ( $C_{17}H_{35}CO_2^-$ ). Peterson '554 also discusses the use of a surfactant, such as sodium alkylsulfate, in combination with lithium salts of fatty acids. However, Peterson '554 does not disclose or suggest an antiloading composition as recited in Claim 9, as currently amended. In particular, Peterson '554 does *not* disclose or suggest an antiloading composition that includes *a mixture of two different antiloading compounds*, each of which *meets the structural criteria* of Claim 9, as amended.

For example, lithium stearate does not meet the structural criteria of Claim 9. In addition,

it is noted that **not all** alkylsulfates (e.g.,  $(C_nH_{2n+1})OSO_3^-$ ) meet the stated criteria of currently-amended Claim 9. As stated by Dr. Rice in Section 6 of the Declaration, not all alkylsulfates meet the structural criteria of currently-amended Claim 9. Also, not all alkylsulfates have a water contact angle less than that of zinc stearate. As shown in Exhibit A, a water contact angle is often used as a measure of surface hydrophobicity, *i.e.*, the higher the contact angle is, the more hydrophobic the surface becomes (see enclosed Exhibit A: US 2003/0083389, [0168]). Thus, depending upon specific characteristics of the alkyl group of the alkylsulfates, for example, the number of hydrocarbons, the hydrophobicity of the alkylsulfates varies, and in turn, their water contact angles vary from less than, to larger than, that of zinc stearate.

Thus, although Peterson '554 discusses a mixture of lithium stearate ( $C_{17}H_{35}CO_2^-$ ) and a surfactant, such as sodium alkylsulfate, Peterson '554 does not anticipate the subject matter of Claim 9, as currently amended.

Law '952 discloses numerous examples of potential antiloading agents, including sodium octadecyl sulfate, for an abrasive article. However, Law '952 does not disclose or suggest an antiloading composition as recited in Claim 9, as currently amended. In particular, Law '952 does **not** disclose or suggest an antiloading composition that includes **a mixture of two different antiloading compounds**, each of which **meets the structural criteria** of Claim 9, as currently amended. As Dr. Rice stated in Section 5 of the Declaration, among the examples of antiloading compounds disclosed in Law '952 (column 30, line 27 through column 31, line 22), sodium octadecyl sulfate is the **only** compound that meets the structural criteria of Claim 9. Therefore, the subject matter of Claim 9, as currently amended, is not anticipated by Law '952.

Law '682 discloses an abrasive article coated with an antiloading composition that includes an antiloading component of the formula  $(C_nH_{2n+1})-COO-M$ , wherein  $n$  is greater than 17 and  $M$  is selected from Group 1 of the Periodic Table. The antiloading composition of Law '682 optionally includes a surfactant, such as sodium dodecyl sulfate. However, Law '682 does not disclose or suggest an antiloading composition as recited in Claim 9, as currently amended. In particular, Law '682 does **not** disclose or suggest an antiloading composition that includes **a mixture of two different antiloading compounds**, each of which **meets the structural criteria** of Claim 9, as currently amended. It is noted that an antiloading component of the formula  $(C_nH_{2n+1})-COO-M$ , wherein  $n$  is greater than 17, does **not** meet the structural criteria of Claim 9,

as currently amended. Therefore, the subject matter of Claim 9, as currently amended, is not anticipated by Law '682.

In summation, as discussed above, none of Peterson '554, Law '952 and Law '682 anticipate the subject matter of independent Claim 9, as currently amended.

*D. Applicants' Invention is Non-obvious in View of Peterson '554, Law '952 and Law '682*

Applicant's claimed invention in independent Claim 9, as currently amended, is also non-obvious in view of Peterson '554, Law '952 and Law '682, taken either separately or in combination for the reasons set forth below.

Applicants' antiloading composition of Claim 9, as currently amended, includes *a mixture* of two different antiloading compounds, each of which meets the specified structural and water contact angle criteria of Claim 9.

None of Peterson '554, Law '952 and Law '682 teaches an antiloading composition as recited in currently-amended Claim 9, as discussed above. In particular, none of these references teaches a mixture of two different antiloading compounds, each of which meets the specified structural and water contact angle criteria of Claim 9. As such, one of ordinary skill in the art would not have known that an antiloading composition as recited in currently-amended Claim 9 has a substantial antiloading effect in view of Peterson '554, Law '952 and Law '682.

In addition, none of these references teaches the use of a *mixture* of organic compounds, each of which has a water contact angle  $W_g$  *less than that of zinc stearate*, and the above-mentioned advantages associated with such antiloading compositions. In contrast, Peterson '554, Law '952 and Law '682 teach the use of "zinc stearate" in combination with other disclosed antiloading compounds therein, respectively. For example, Peterson '554 teaches the use of lithium *stearate*, in combination with *zinc stearate*:

Lithium salts of fatty acids can be blended with other metal salts of fatty acids. For example, lithium stearate can be *blended with zinc stearate* or calcium stearate. (column 5, lines 14-16, emphasis added).

As with Peterson '554, Law '952 teaches the use of *zinc stearate* in combination with the disclosed numerous examples of potential antiloading agents:

The peripheral coating may comprise, *in addition to the antiloading component of the present invention*, and additional conventional antiloading component. Examples of conventional antiloading components include metal salts of fatty acids, for example *zinc stearate*, calcium stearate, and lithium stearate; waxes; graphite; and the like. (column 32, lines 12-17, emphasis added).

Law '682 specifically teaches the use of an antiloading agent more hydrophobic than stearates:

A peripheral coating is prepared from a peripheral coating composition comprising an antiloading component of the formula  $(C_nH_{2n+1})-COO-M$ , wherein *n is greater than 17* ... (column 7, lines 42-45, emphasis added).

Thus, Law '682, in fact, teaches away from using a mixture of two different antiloading agents, each of which has a water contact angle less than that of zinc stearate.

Therefore, Applicants' claimed invention of currently-amended Claim 9 would not have been obvious in view of Peterson '554, Law '952 and Law '682, taken either separately or in combination.

#### *D. Summation*

As discussed above, none of Peterson '554, Law '952 and Law '682 discloses or suggests the use of a mixture of two different antiloading compounds, each of which meets the structural criteria and water contact angle criteria of currently-amended Claim 9. Therefore, the subject matter of independent Claim 9, as currently amended, is novel and non-obvious in view of Peterson '554, Law '952 and Law '682, taken either separately or in combination. Claims 13-15 are dependent from independent Claim 9, and thus these claims also are novel and non-obvious in view of Peterson '554, Law '952 and Law '682, taken either separately or in combination. Claim 12 is canceled. Accordingly, reconsideration and withdrawal of these rejections are respectfully requested.

#### Rejection of Claims 9-13 under 35 U.S.C. § 103(a) in View of Gaeta '338

Claims 9-13 are rejected under 35 U.S.C. § 103(a) as obvious over US 4,973,338

(hereinafter "Gaeta '338").

Gaeta '338 discloses a coated abrasive that includes an oversize coat of a quaternary ammonium anti-static compound typically having from about 15 to about 35 carbon atoms.

Gaeta '338 does not disclose or suggest an antiloading composition as recited in independent, currently-amended Claim 9. In particular, Gaeta '338 does not teach an antiloading compound that meets the structural criteria of in currently-amended Claim 9. Moreover, Gaeta '338 does not teach an antiloading composition that includes a mixture of such antiloading compounds. In addition, Gaeta '338 does not teach the use of a mixture of organic compounds, each of which has a water contact angle  $W_g^\circ$  less than that of zinc stearate. As such, one of ordinary skill in the art would not have known that an antiloading composition as recited in currently-amended Claim 9 has a substantial antiloading effect in view of Gaeta '338.

Therefore, the subject matter of independent Claim 9, as currently amended, and Claims 10-11 and 13, dependent from independent Claim 9, is not obvious in view of Gaeta '338. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

Rejection of Claims 9-11, 13 and 16 under 35 U.S.C. § 103(a) in View of Law '542

Claims 9-11, 13 and 16 are rejected under 35 U.S.C. § 103(a) as obvious over US 5,667,542 (hereinafter "Law '542").

Law '542 discloses an abrasive article that includes an antiloading component in a peripheral coating of the abrasive article. Law '542 also discloses antiloading components of formula 1 and 2, and mixtures thereof (see column 4, lines 1-50 of Law '542).

Law '542 does not disclose or suggest an antiloading composition as claimed in independent, currently-amended Claim 9. In particular, none of the compounds of formula 1 and 2 of Law '542 meets the structural criteria of currently-amended Claim 9. Moreover, there is no disclosure or suggestion in Law '542 of an antiloading composition that includes a mixture of such antiloading compounds.

In addition, Law '542 does not teach the use of a *mixture* of organic compounds, each of which has a water contact angle  $W_g^\circ$  *less than that of zinc stearate*. In contrast, Law '542 teaches

the use of "zinc stearate" in combination with the antiloading components of formula 1 and 2:

The peripheral coating may comprise, *in addition to* the antiloading component of the present invention, additional conventional antiloading component. Examples of conventional antiloading components include metal salts of fatty acids, for example *zinc stearate*, calcium stearate, and lithium stearate; waxes; graphite; and the like. (column 19, lines 27-31, emphasis added).

As such, Applicants' claimed invention of currently-amended Claim 9 would not have been obvious in view of Law '542.

Therefore, the subject matter of independent Claim 9, as currently amended, and Claims Claims 10-11 and 13 that are dependent from independent Claim 9 is not obvious in view of Law '542. Claim 16 is canceled. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

New Claims 36-39 are Novel and Non-obvious in View of the Cited References

*A. With Respect to Claims 36 and 37*

New independent Claim 36 is directed to an abrasive product that includes an antiloading composition comprising a lauryl sulfate in an amount that reduces the accumulation of swarf during grinding, *i.e.*, to have antiloading effect.

None of the recited references disclose or suggest the use of such an antiloading composition as recited in independent Claim 36. In particular, there is no disclosure or suggestion in Law '952, Gaeta '338 and Law'542 of an antiloading composition that includes a lauryl sulfate.

Peterson '554 discloses the use of sodium alkylsulfates as surfactants in antiloading compositions in combination with the antiloading compounds disclosed in Peterson '554. However, Peterson '554 does not disclose or suggest the use of a lauryl sulfate in antiloading compositions.

Law '682 discloses the use of sodium dodecyl sulfate as a surfactant in antiloading compositions in an amount of about 10%, or less, by weight (see column 7, lines 26-30).



However, as stated by Dr. Rice in Section 7 of the Declaration with reference to Exhibit B, **10%, or less**, by weight, of sodium lauryl sulfate in an antiloading composition is **not** sufficient to have any antiloading effect. Moreover, Law '682 **teaches away** from using a higher amount of sodium lauryl sulfate than about 10%, specifically stating that on column 7, lines 26-30:

More preferably, the anionic surfactant is present in an amount of about 10% by weight or **less**, even **more preferably about 5% by weight or less, even more preferably about 2% by weight or less**, and most preferably about 2% by weight based on the weight of the antiloading component. (emphasis added)

As such, the subject matter of new independent Claim 36 and Claim 37 dependent therefrom is novel and non-obvious in view of the cited references, taken either separately or in combination.

*B. With Respect to Claims 38 and 39*

New independent Claim 38 is directed to an abrasive product that includes an antiloading composition comprising a lauryl sulfate, wherein the lauryl sulfate is the **only** organic antiloading compound included in the antiloading composition.

None of the recited references disclose or suggest the use of such an antiloading composition. In particular, there is no disclosure or suggestion in Law '952, Gaeta '338 and Law'542 of an antiloading composition that includes a lauryl sulfate.

Also, as discussed above, although Peterson '554 discloses the use of sodium alkylsulfates as surfactants in antiloading compositions, Peterson '554 does not disclose or suggest a lauryl sulfate. Moreover, Peterson '554 specifically teaches the use of sodium alkylsulfates **as surfactants in combination with the organic antiloading compounds** of Peterson '554, *i.e.*, lithium salts of fatty acids. Thus, Peterson '554 **teaches away** from using a lauryl sulfate as the only organic compound that has an antiloading effect for an antiloading composition.

As with Peterson '554, although Law '682 discloses the use of sodium dodecyl sulfate as a surfactant in antiloading compositions, Law '682 does not disclose or suggest the use of sodium lauryl sulfate as the only organic compound that has an antiloading effect for the antiloading

compositions of Law '682. Rather, Law '682 specifically teaches the use of sodium lauryl sulfate as a surfactant *in combination with the numerous organic antiloading compounds* of Law '554. Thus, as with Peterson '554, Law '682 *teaches away* from using a lauryl sulfate as the only organic compound that has an antiloading effect for an antiloading composition.


As such, the subject matter of new independent Claim 38 and Claim 39 dependent therefrom is novel and non-obvious in view of the cited references, taken either separately or in combination.

### SUMMARY AND CONCLUSIONS

As discussed above, Claims 9-11 and 13-15, as currently amended, and new Claims 36-39 are novel and non-obvious in view of the prior art of record. Claims 12 and 16 are canceled. As amended, Claims 10 and 11 are now definite, meeting the requirements of 35 U.S.C. § 112, second paragraph. Therefore, in view of the above amendments and remarks, it is believed that all currently-pending claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

By 

N. Scott Pierce

Registration No. 34,900

Telephone: (978) 341-0036

Facsimile: (978) 341-0136

Concord, MA 01742-9133

Dated: 4/4/06